PRELIMINARY

INSTRUCTION BOOK

FOR

CARRIER MONITOR

HALLAMORE MFG. CO.

LONG BEACH, CALIFORNIA

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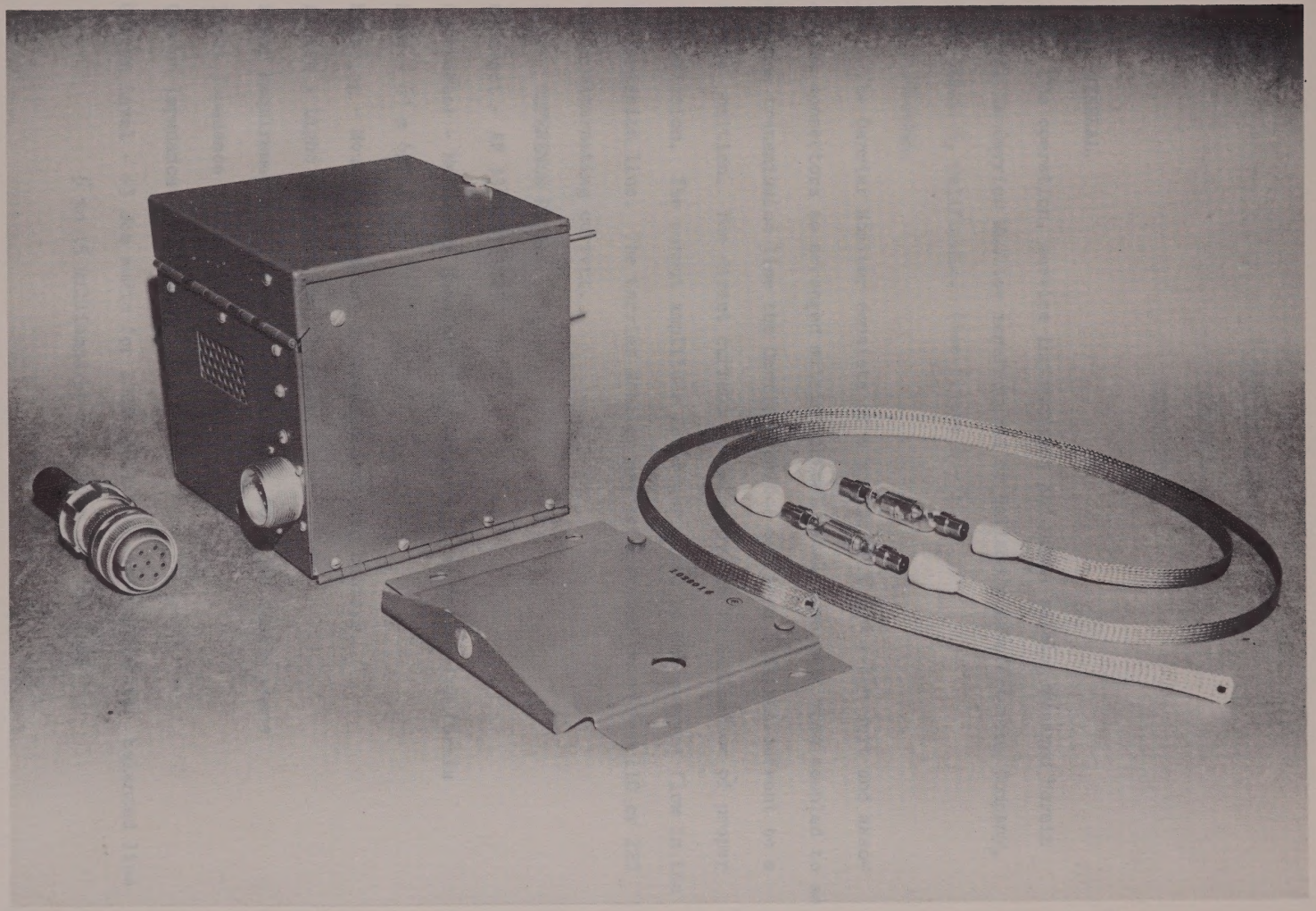


Fig. 1-1 ---Carrier Monitor

CARRIER MONITOR

SECTION I

DESCRIPTION

1-1. GENERAL.

1-2. The operation, service instructions and parts catalog covered herein pertain to Carrier Monitor manufactured by Hallamore Manufacturing Company, Long Beach 5, California. (See figure 1 - 1)

1-3. PURPOSE.

1-4. The Carrier Monitor consists of a single 6" x 6¼" x 8¼" unit and associated connectors so arranged within a steel metal case that when coupled to an antenna transmission line the Carrier Monitor provides a direct current to a remote position. The direct current output provides an indication of proper transmission. The output amplitude is proportional to the current flow in the transmission line. The Carrier Monitor may be operated on either 110 or 220 volts alternating current.

1-5. REFERENCE DATA.

Contract - AF 33(600)21727

Contractor - Hallamore Manufacturing Company, Long Beach, California

Size - 6" x 6¼" x 8¼"

Mounting - Mounting bracket secured on mounting centers.

Finish - Light aluminum grey lacquer.

Power Requirements - 110 or 220 volts A.C. 60 cycle single phase

Input Impedance - 600 ohm

Output Impedance - 600 ohm

Output Level - +3 dbm audio for 100% modulation into a 600 ohm balanced line

5 to 15 milliamperes d.c. into 100 ohm load

Frequency Response - 2 to 30 megacycles

Transmission Power Limits - 500 to 50,000 watts

Operating Temperature Limitation - 0 to 65°C

SECTION II

INSTALLATION AND OPERATION

2-1. PREPARATION FOR USE.

2-2. No special instructions are necessary for unpacking or handling the Carrier Monitor. Great care should be exercised however, in the handling of the equipment to prevent damage to the fragile components. (See figure 2 - 1)

2-3. INSTALLATION AND ADJUSTMENT OF CARRIER MONITOR.

2-4. Installation. Separate installation instructions are supplied with each Carrier Monitor. The Carrier Monitor unit is equipped with a bracket to facilitate mounting on a vertical surface. All external connections to the Carrier Monitor other than the coupling to the RF transmission line are accomplished through a single cannon type connector (SO-101). The mate for this connector is supplied as part of the unit.

2-5. Adjustment.

CAUTION

Before turning switch S101 on make sure switch S102 is in proper position corresponding to the power voltage being supplied to the Carrier Monitor.

When the Carrier Monitor is used with a transmitter having a power output of 500 to 6000 watts, make the following adjustments:

a. With a total load (including resistance of milliammeter) across jack J101 and the transmitter operating, adjust R107 for a maximum output of 15 milliamperes.

b. With a total resistive load (including resistance of dbm meter) of 600 ohms across J102 and the transmitter operating, adjust R112 for an audio output of +3 dbm.

When the Carrier Monitor is used with a transmitter having a power output of 2000 to 50,000 watts, make the following adjustments:

a. Energize relay RY101.

b. With a total load (including resistance of milliammeter) across jack J101 and the transmitter operating, adjust R104 for a maximum output of 15 milliamperes.

c. With a total resistive load (including resistance of dbm meter) of 600 ohms across J102 and the transmitter operating, adjust R112 for an audio output of +3 dbm.

2-6. Operation. When the Carrier Monitor has been properly set up and adjusted, no further operational attention is required.

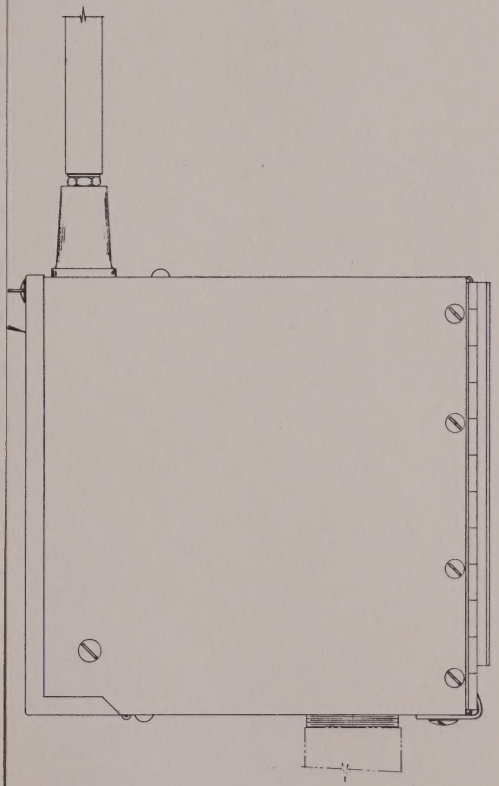


Fig. 2-1 --- Plane View - Carrier Monitor

When the Carrier Monitor is used with a transmitter having a power output of 2000 to 50,000 watts, make the following adjustments:

a. Energize relay K101.

b. With a total load (including resistance of milliammeter) across jack J101 and the transmitter operating, adjust R106 for a maximum output of 15 milliamperes.

c. With a total resistive load (including resistance of dummy meter) of 600 ohms across J102 and the transmitter operating, adjust R110 for an audio output of +3 dbm.

3-5. Operation. When the Carrier Monitor has been properly set up and adjusted, no further operational attention is required.

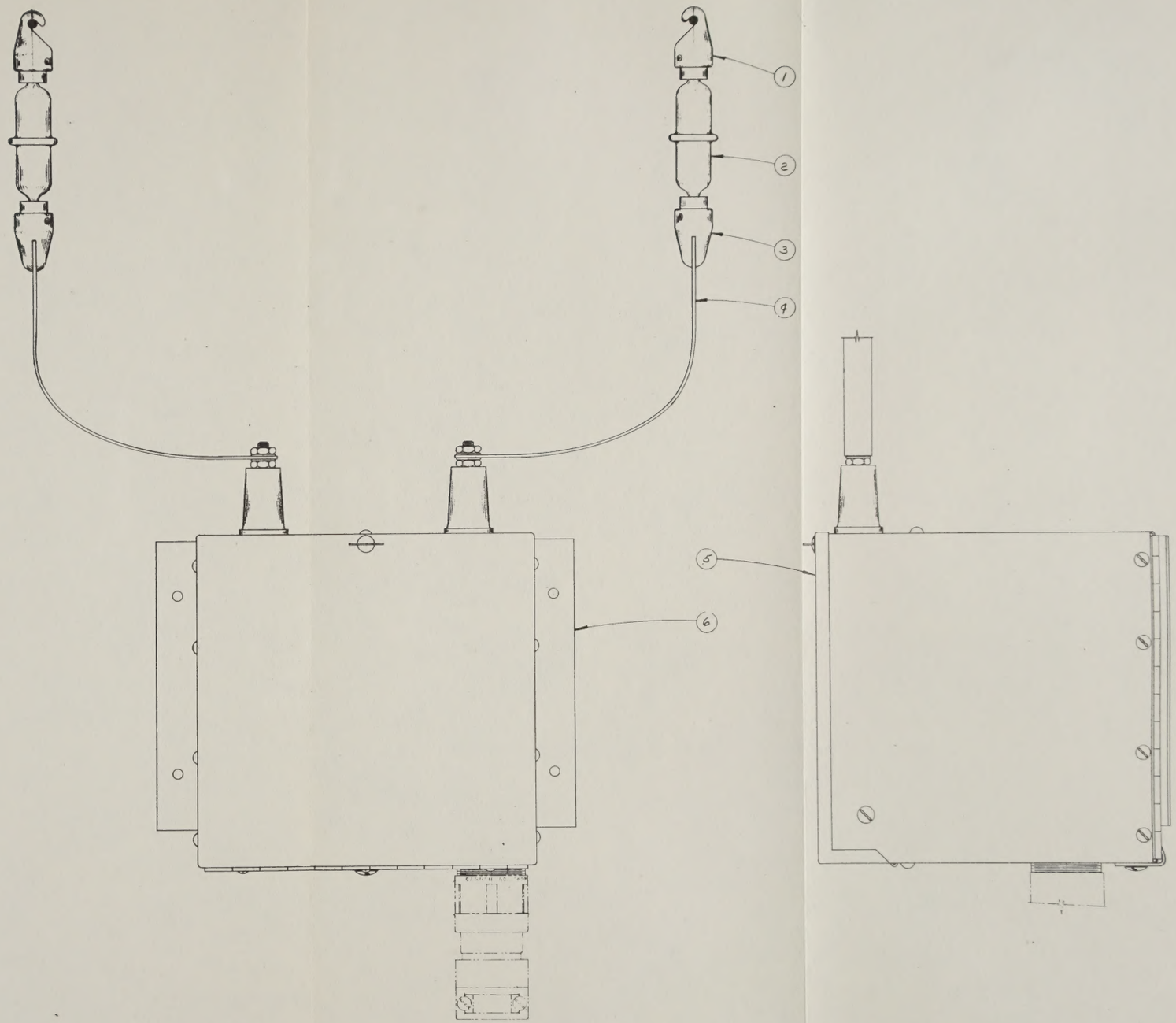


Fig. 2-1 --- Plane View - Carrier Monitor

CARRIER MONITOR

SECTION III

MAINTENANCE

3-1. PREVENTATIVE MAINTENANCE. (See figures 3 - 1, 3 - 2, and 3 - 3)

3-2. To prevent malfunction of carrier monitor components and parts proceed as follows:

a. Clean electron tubes with a clean dry, lint-free cloth.

b. Remove dirt or corrosion from electron tube pins with fine sandpaper.

c. Remove corrosion or oxidation from electron tube sockets contacts with fine sandpaper.

d. Remove grease and dirt, if any, from rheostats and potentiometers with a soft, clean cloth dampened with dry-cleaning solvent.

NOTE

Do not use solvents when cleaning capacitors or resistors.

Solvents will dissolve the protective fungi-proof coating.

e. Inspect each capacitor for discoloration, breaks, and chipping.

f. Inspect terminal type capacitor terminals for insulation cracks, looseness, corrosion, and evidence of leakage of electrolyte.

g. Inspect the metal case container of each unit for bulges, dents, cracks and other damage of any kind.

h. Inspect all fuses for loose ends and cracks or breaks in their glass encasings.

i. Inspect the fuse holder for evidence of burning, charring, corrosion, and dirt; make sure the spring tension in fuse holder is strong enough to hold fuse securely and maintain good electrical contact.

j. Inspect variable air type capacitors for dust, dirt, lint and faulty soldering. Inspect the capacitor plates for visible damage such as nicks and

bending.

k. Inspect the mechanical action of each switch and look for dirt, dust, and corrosion on all exposed parts. In the instance of enclosed switches check the switch action of the switch by flipping the toggle.

CAUTION

Do not operate S102 in this manner. If the unit is connected to a 220 volt A. C. source and S102 is thrown to the 110 volt position while S101 is "on", permanent damage will result.

l. Inspect the metallic parts of each potentiometer control for dust, dirt, and evidence of corrosion. Make sure that the unit has no mechanical defects such as loose terminal lugs, loose body assembly, and a loosely keyed shaft.

m. Check the firmness of each tube in its socket. Press the tube into the socket, exerting only normal pressure to press tube in place. When the tube is properly seated it should be held firmly in place, as evidenced by feel.

n. Let the tubes cool off before removing them from their sockets. Use the appropriate tube remover to remove miniature tubes; also, straighten the miniature tube pins in the appropriate pin straightener before trying to insert the miniature tube into its socket. When inserting the miniature tube do so with the top of the tube socket visible so that the tube pins may be properly aligned in relation to the socket.

o. Inspect the glass or metal envelope of each tube for dirt or corrosion, as applicable; also check to see that the tube envelope is not loose. Make sure that miniature tube pins are not loose or broken, being careful not to bend the pins during removal or insertion of the miniature tube. Check to see that the glass envelope is not chipped at the pins.

p. Examine the body of each resistor for blistering, discoloration, and breaks, due to possible overheating.

q. Inspect all resistor leads for dirt, dust, corrosion, and looseness. Check the security of all mountings.

3-3. CORRECTIVE MAINTENANCE.

3-4. Signal Tracing. Referring to the overall schematic of the unit check power input and trace signals from input to output using a voltmeter. Voltage and resistance charts will be supplied when available.

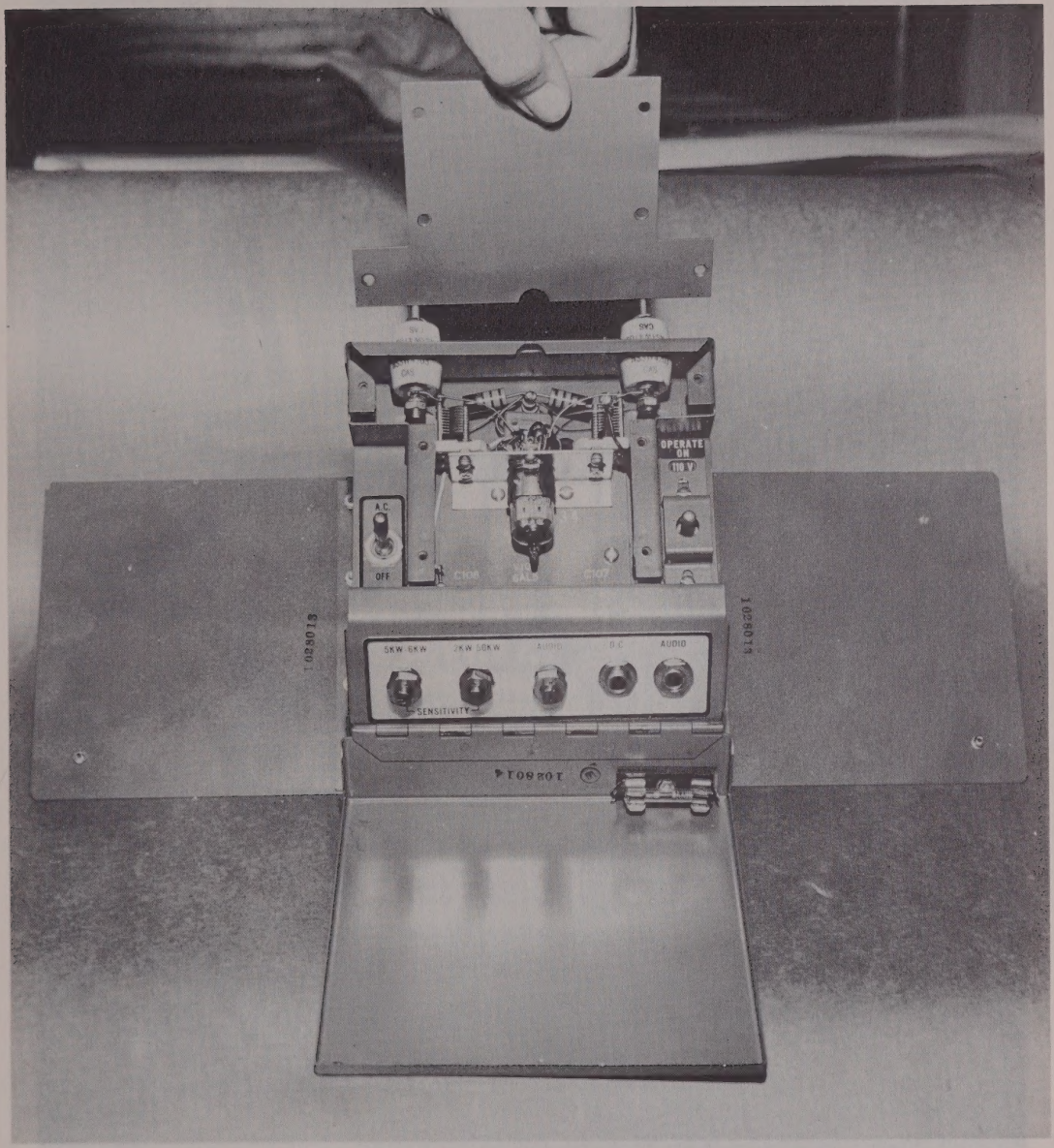


Fig. 3-1 --- Top View --- Carrier Monitor

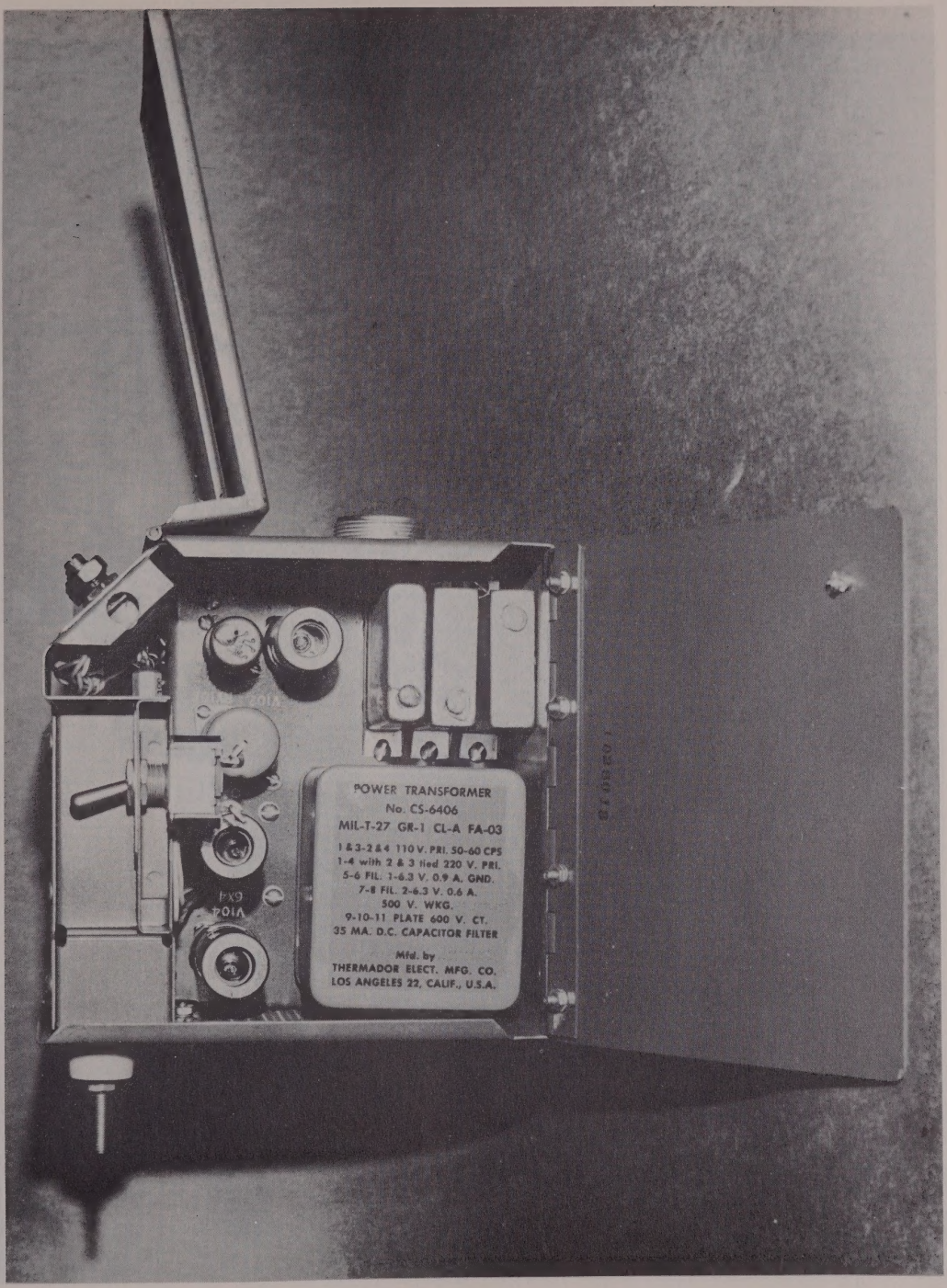

POWER TRANSFORMER
No. CS-6406
MIL-T-27 GR-1 CL-A FA-03
1&3-2&4 110 V. PRI. 50-60 CPS
1-4 with 2 & 3 tied 220 V. PRI.
5-6 FIL. 1-6.3 V. 0.9 A. GND.
7-8 FIL. 2-6.3 V. 0.6 A.
500 V. WKG.
9-10-11 PLATE 600 V. CT.
35 MA. D.C. CAPACITOR FILTER
Mfd. by
THERMADOR ELECT. MFG. CO.
LOS ANGELES 22, CALIF., U.S.A.

Fig. 3-2 --- Left Side View - Carrier Monitor

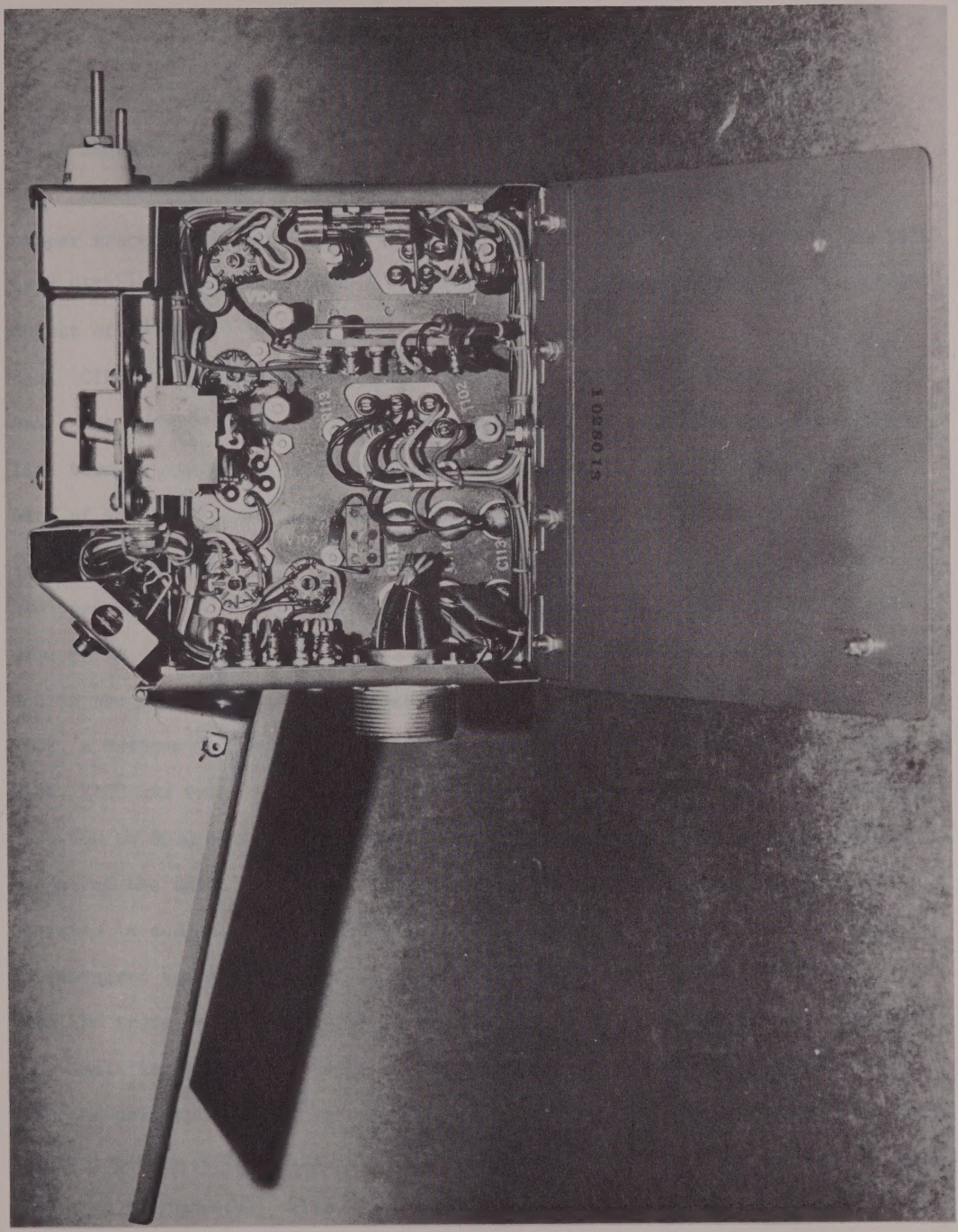


Fig. 3-3 --- Right Side View - Carrier Monitor

CARRIER MONITOR

SECTION IV

THEORY OF OPERATION

4-1. GENERAL.

4-2. The Carrier Monitor provides d.c. and audio currents for indication of proper transmitter operation at a remote position. The Carrier Monitor may be used with transmitters operating between 2 and 30 megacycles and having a power output of 500 to 50,000 watts.

4-3. CIRCUIT ANALYSIS (See Figure 4-1).

4-4. The Carrier Monitor is capacitively coupled to a 600 ohm open transmission line through capacitors C101 and C102. Capacitors C101 and C102 also form a part of the voltage divider network which operates in conjunction with the RF full wave rectifier V101. The voltage divider network consists of resistors R101 and R102, and capacitors C101, C102, C103 and C104. Capacitors C103 and C104 which are variable air type capacitors, are adjusted at the factory to obtain the proper rectifier voltage output. The RF rectifier output is fed to V102, a cathode follower D.C. amplifier, through resistor networks R104, R105, R106, R107 and relay RY101. When the Carrier Monitor is operated in conjunction with 500 to 6000 watt transmission, relay RY101 is de-energized and the D.C. output of the unit is adjusted by means of R107. When the Carrier Monitor is operated in conjunction with 2000 to 50,000 watt transmission the relay RY101 is energized and the D.C. output of the unit is adjusted by means of R104. Both the audio and D.C. outputs of the unit are taken from the cathode follower D.C. amplifier V102. The audio output is adjusted by R112 which is in series with the primary of audio transformer T101. High voltage D.C. power for the unit is developed by a full wave rectifier V104 and controlled by voltage regulator V103 at a constant 150 volts.

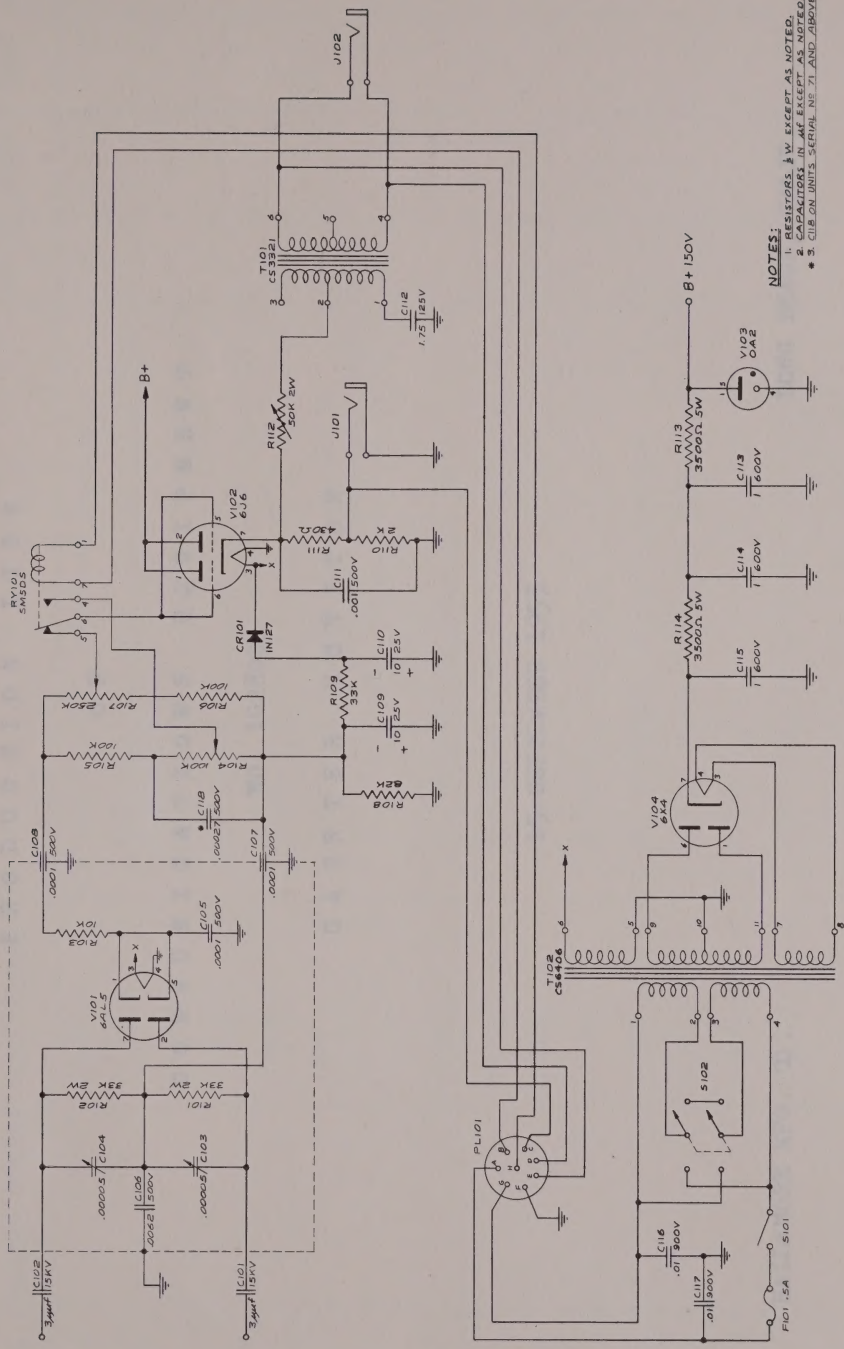
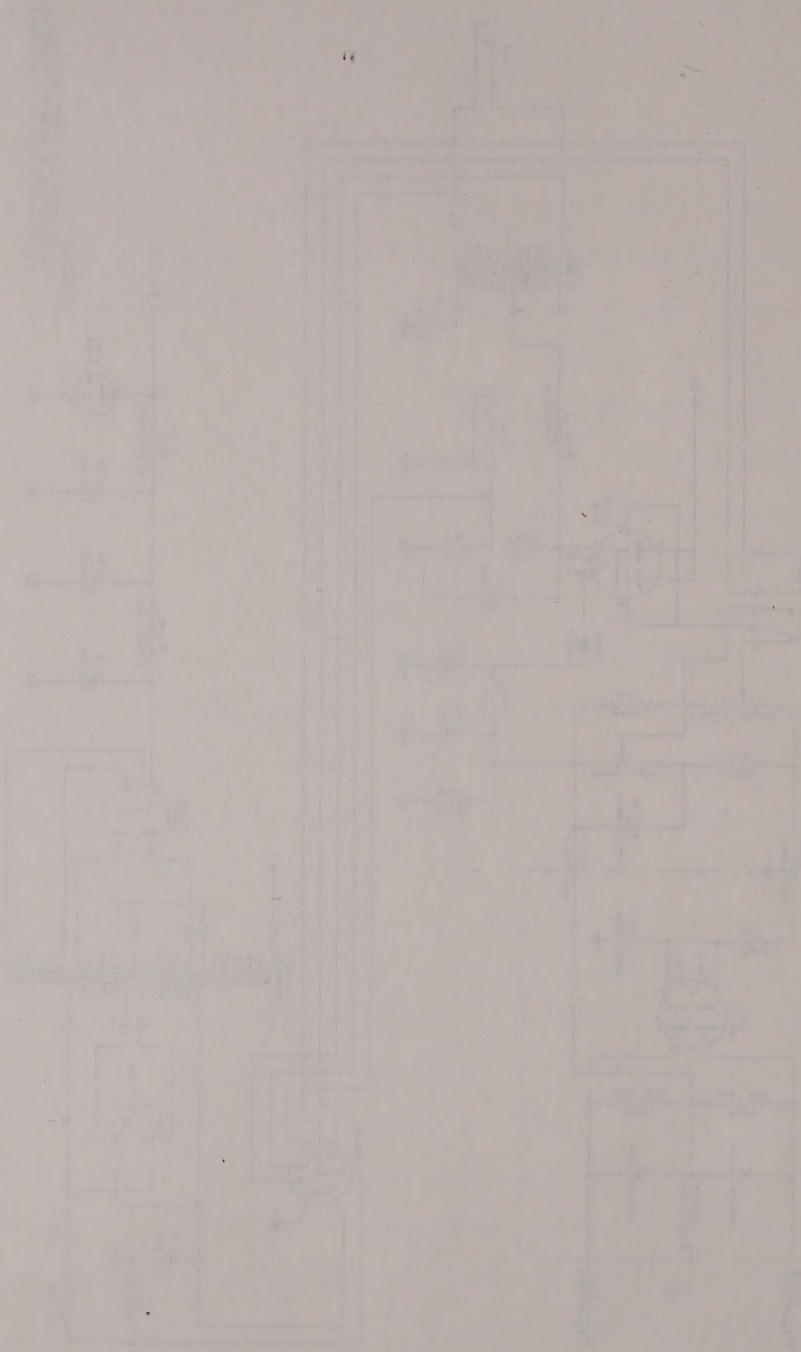


Fig. 4-1 --- Carrier Monitor Schematic



PRODUCTION LIST

OF

COMMUNICATIONS EQUIPMENT

NO. 1028001

CARRIER MONITOR

15 SEPTEMBER 1953

HALLAMORE MFG. CO. LONG BEACH, CALIF.

STOCK NUMBER			DESCRIPTION	UNITS PER ASS'Y	USABLE ON CODE	SOURCE CODE	QTY PER ARTICLE
CLASS CODE	SERIAL NUMBER	PART NUMBER	1 2 3 4 5 6 7				
		1028017	EQUIPMENT INSTL., Carrier Monitor				1
		1028018	CONNECTOR, Carrier Monitor Trans.Line				2
		1028019	CONNECTOR ASSY., Carrier Monitor				2
		1028020	CONNECTOR, Soldered				2
		1028021	BRAID, Soldered				2
		21-Y	CAPACITOR, 3 MMFD,plus minus 10%, 15000 wvdc,(Jennings Radio Mfg.Corp.-San Jose,Calif.) (C101, C102)				2
		1028016	BRACKET, Carrier Monitor Wall				1
		1028016-3	BRACKET				1
		1028016-4	RIVET				2
		A5-30	FASTENER, Dzus (DZ)				1
		1028001	BOX ASSEMBLY, Carrier Monitor				1
		1028011	COVER, Carrier Monitor Shield				1
		AN508-4-4	SCREW				10
		AN3102A-20-7	CONNECTOR, Receptacle - Box Mounting (J103)				1
		AN936-B4	WASHER				14
		AN340-4	NUT				14

CONTRACT: AF 33(600) 21727
CONTRACTOR: HALLAMORE MFG. CO.

DATE:

STOCK NUMBER			DESCRIPTION	UNITS PER ASS'Y	USABLE ON CODE	SOURCE CODE	QTY PER AR - TICLE
CLASS CODE	SERIAL NUMBER	PART NUMBER	1 2 3 4 5 6 7				
		AN3106B-20-75	CONNECTOR, Cable				1
		AN3057-12	CLAMP, Cable Connector				1
		AN3420-1Z	BUSHING, Cable Clamp Telescoping				1
		135-40	INSULATOR, (JON)				2
		357001	FUSEHOLDER, Single (LTF)				2
		AN508-6-5	SCREW				1
		AN936-A6	WASHER				23
		AN340-6	NUT				30
		313.500	FUSE, .5AMP 250V (LTF) (F101)				2
		1028013	COVER, Carrier Monitor Side				2
		AN508-6-3	SCREW				18
		1028013-3	COVER, Side				1
		A3-25	FASTENER, Dzus (DZ)				2
		1028014	COVER ASSY., Carrier Monitor Front				1
		1028015	COVER, Welded				1
			HINGE				3
		AW-25	FASTENER, Dzus (DZ)				1
		1028006	EQUIPMENT ASSY., Carrier Monitor Fr.Pan.				1

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STOCK NUMBER			DESCRIPTION	UNIT OF ISSUE	TARIFF OR SCHED CODE	SOURCE CODE	QTY PER AS-SEMBLY
CLASS CODE	SERIAL NUMBER	PART NUMBER	1 2 3 4 5 6 7				

STOCK NUMBER			DESCRIPTION	UNITS PER ASS'Y	USABLE ON CODE	SOURCE CODE	QTY PER ARTICLE
CLASS CODE	SERIAL NUMBER	PART NUMBER	1 2 3 4 5 6 7				
		1028007	PANEL ASSY., Front				1
		1028008	PANEL, Front Welded				1
		1028009-1	BRACKET, Shield, Welded				1
		1028009-2	BRACKET, Shield, Welded				1
		1028010-1	BRACKET, Switch, Welded				1
		1028010-2	BRACKET, Switch, Welded				1
		SB3-2	SPRING, Dzus (DZ)				3
		AN441-3-3P	RIVET, 3/32 Dia.x 3/16 lg.				8
			NUT, Anchor				8
		1028012	BRACKET, Carrier Monitor Tube				1
		AN515-6-4	SCREW				12
		AN936-B6	WASHER				11
		1028023	LOCK, Carrier Monitor Switch				1
		AN508-4-3	SCREW				2
		1028024	PLATE, Carrier Monitor Designation				1
		1028025	PIATE, Carrier Monitor Designation				1
		JAN6AL5	TUBE, Electron (V101)				1
		MAPC-50	CAPACITOR, Variable, 49 mmfd, plus minus 10% (HMM) (C103,C104)				2

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STOCK NUMBER			DESCRIPTION	UNITS PER ASS'Y	USABLE ON CODE	SOURCE CODE	QTY PER AR - TICLE
CLASS CODE	SERIAL NUMBER	PART NUMBER	1 2 3 4 5 6 7				
		TS102C01	SOCKET, Electron tube,7 pin Min.Ceramic (EBY)				1
		VTS102401	SHIELD, Electron tube, 7 pin Miniature, Ventilated 1 3/8" (EBY)				1
		ST-52N	SWITCH, Toggle DPDT (KKE) (S102)				1
		ST-42A	SWITCH, Toggle SPST (KKE) (S101)				1
		CM-30B622M	CAPACITOR, Fixed mica,6200 mmfd, plus minus 20%, 500 V (ARE)(C106)				1
		327	CAPACITOR, Feed through 100 mmfd, plus minus 20% (ERC) (C107,C108)				2
		JLU2541	RESISTOR, Variable composition,250000 Ohm (AB) (R107)				1
		JLU1041	RESISTOR, Variable composition,100000 Ohms (AB) (R104)				1
		JLU5031	RESISTOR, Variable composition,50000 Ohms (AB) (R112)				1
		C11	JACK,(Switchcraft Inc.,1328-30N.Halsted St, Chicago 22,Ill.) (J101, J102)				2
		CM15E101J	CAPACITOR, Fixed mica, 100 mmfd, plus minus 5%, 500 V (ARE) (C105)				1
		RC20GF103K	RESISTOR, Fixed composition, 10000 Ohms plus minus 10%, $\frac{1}{2}$W (AB)(R103)				1

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DATE:

STOCK NUMBER			DESCRIPTION	ORDER FROM ABBR'V	CHANGE ON ORDER	SOURCE CODE	QTY PER ASSY
CLASS CODE	SERIAL NUMBER	PART NUMBER					
		9810C001	ELCAPT, Electron tube,7 pin Min.Dervamic (EEV)				3
		V7812C001	ELCAPT, Electron tube, 7 pin Miniature Ventilated I 5/8" (EEV)				1
		RT-52A	RETMA, Tube DPDT (EEV) (81U2)				1
		CK-5A	CRYSTL, Tube DPDT (EEV) (81U1)				4
		CK-5008S2A	CRYSTL, Fixed mica,6500 mmfd, plus minus 20%, 500 V (AMERICAN)				2
		1E2	CAPACITOR, Fixed ceramic,500 mmfd, plus minus 20% (ERIE) (81U2)				3
		1E8C5A1	CAPACITOR, Variable compression,25000 (ARCO) (81U2)				1
		1E8C5A2	CAPACITOR, Variable compression,150000 (ARCO) (81U2)				1
		1E8C5A3	CAPACITOR, Variable compression,50000 (ARCO) (81U2)				1
		C1A	CAPACITOR, Fixed mica, 1825-20% Centered 50, Chicago 50,111.) (81U1)				1
		CM15E101J	CAPACITOR, Fixed mica, 100 mmfd, plus minus 5%, 500 V (ARCO) (81U2)				4
		M39014/01A	CAPACITOR, Fixed ceramic, 10000 mmfd plus minus 10%, 30 (AB)(81U2)				1

STOCK NUMBER			DESCRIPTION	UNITS PER ASS'Y	USABLE ON CODE	SOURCE CODE	QTY PER ARTICLE
CLASS CODE	SERIAL NUMBER	PART NUMBER	1 2 3 4 5 6 7				
		RC42GF333J	RESISTOR, Fixed Composition, 33000 Ohms plus minus 5%, 2 W (AB)(R101, R102)				2
		1028002	EQUIPMENT ASSY., Carrier Monitor Box				1
		1028003	BOX ASSY., Carrier Monitor				1
		1028004	BOX, Carrier Monitor				1
			SCREEN, Vert., welded				1
		1028005	PANEL, Carrier Monitor sub, welded				1
		1028026	TERMINAL BOARD, Carrier Monitor unit, 10 Lugs				1
		1028027	TERMINAL BOARD, Carrier Monitor unit, 10 Lugs				1
		JAN6X4	TUBE, Electron (V104)				1
		JAN0A2	TUBE, Electron (V103)				1
		JAN6J6	TUBE, Electron (V102)				1
		TS102P01	SOCKET, Electron tube, 7 pin Miniature Mica (EBY)				4
		AN515-4-3	SCREW				10
		VTS102403	SHIELD, Electron tube, 7 pin Miniature Ventilated 2¼" (EBY)				2
		VTS102402	SHIELD, Electron tube, 7 pin Miniature Ventilated 1 3/4" (EBY)				2

CONTRACT: AF 33(600) 21727 DATE:
CONTRACTOR: HALLAMORE MFG. CO.

STOCK NUMBER			DESCRIPTION	UNITS PER ASS'Y	USABLE ON CODE	SOURCE CODE	QTY PER ARTICLE
CLASS CODE	SERIAL NUMBER	PART NUMBER	1 2 3 4 5 6 7				
		SM5DS	RELAY, 24V SPDT (PBR) (K101)				1
		CM-20B102V	CAPACITOR, Fixed mica, .001 mfd, plus minus 10%, 500 wvdc (ARE) (C111)				1
		310000U	CAPACITOR, Fixed ceramic bypass,.01 mfd plus minus 20%, 900 wvac, (Radio Materials Corp.,3325 North California Ave., Chicago 18,Ill.) (C116,C117)				2
		YAB6100J	CAPACITOR, Fixed paper metal encased, 1 mfd, plus minus 20%,600 V (CLD) (C113,C114, C115)				3
		IN127	RECTIFIER, Germanium diode (HUG)(CR101)				1
		EB2221	RESISTOR, Fixed composition, 2200 Ohms, plus minus 10%, ½ W(AB) (R110)				1
		EB1041	RESISTOR, Fixed composition, 100000 Ohms, plus minus 10%, ½ W, (AB) (R105,R106)				2
		EB8231	RESISTOR, Fixed composition,82000 Ohms plus minus 10%, ½ W, (AB) (R108)				1
		EB3331	RESISTOR, Fixed composition, 33000 Ohms, plus minus 10%, ½ W (AB) (R109)				1
		GB4315	RESISTOR, Fixed composition, 430 Ohms plus minus 5%, 1 W (AB)(R111)				1

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STOCK NUMBER			DESCRIPTION	USABLE ON CODE	SOURCE CODE	QTY PER ASSY
CLASS CODE	SERIAL NUMBER	PART NUMBER	1 2 3 4 5 6 7			
		962126	RELAY, DRY REED (FSN) (5120)			1
		CM-2081DCV	CAPACITOR, Fixed mica, .001 mfd, plus minus 10%, 500 wvdc (ARC) (0111)			1
		3160000	CAPACITOR, Fixed ceramic dielec,.01 mfd plus minus 20%, 200 wvdc (Bell & Howell Co., South California Div., Chicago IL) (0111,0113)			2
		7480102	CAPACITOR, Fixed paper metal encased, (0139) (0113,0119, 0113)			5
		1N137	RECTIFIER, Germanium diode (7080)(0510)			1
		AM6221	CAPACITOR, Fixed composition, 2200 Ohms, plus minus 10%, 2 W(AB) (0198)			1
		8TP0L1	RESISTOR, Fixed composition, 100000 Ohms, plus minus 10%, 1 W, (AB) (0107,0105)			2
		RC07Y1	RESISTOR, Fixed composition,82000 Ohms plus minus 10%, 1 W, (AB) (0106)			1
		RC07Y1	RESISTOR, Fixed composition, 5600 Ohms, plus minus 10%, 1 W (AB) (0106)			1
		CM-2R5	CAPACITOR, Fixed mica, 620 Ohms plus minus 5%, 1 W (0111)			1

STOCK NUMBER			DESCRIPTION	UNITS PER ASS'Y	USABLE ON CODE	SOURCE CODE	QTY PER ARTICLE
CLASS CODE	SERIAL NUMBER	PART NUMBER	1 2 3 4 5 6 7				
		COMM	RESISTOR, Fixed wire wound, 3500 Ohms, plus minus 10%, 5 W, (OM) (R113, R114)				2
		AN515-6-21	SCREW				2
		CS-6406	TRANSFORMER, Power (TRM) (T102)				1
		AN936-B8	WASHER				4
		AN340-8	NUT				4
		CS-3321	TRANSFORMER, Audio frequency output (TRM) (T101)				1
		AN515-6-5	SCREW				1
		1028022	BRACKET, Carrier Monitor terminal board welded				1
		35-200	SPRING, Dzus (DZ)				1

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CONTRACTOR: HALLAMORE MFG. CO.

DATE:

INDEX

CODE SYMBOLS: MANUFACTURER'S NAME

CODE	NAME	ADDRESS
AB	Allen-Bradley Co.	Milwaukee, Wis.
ARE	Arco Electronics Inc.	New York, N. Y.
CLD	Cornell-Dubilier Electric Corp.	So. Plainfield, N. J.
DZ	Dzus Fastener Co., Inc.	Babylon, N. Y.
EBY	Hugh H. Eby, Inc.	Philadelphia, Pa.
ELCO	Elco Corp.	Philadelphia, Pa.
ERC	Erie Resistor Corp.	Erie, Pa.
HMM	Hammarlund Mfg. Co., Inc.	New York, N. Y.
HUG	Hughes Aircraft Co.	Culver City, Calif.
JON	E. F. Johnson Co.	Waseca, Minn.
KKE	Kulka Electric Mfg. Co., Inc.	Vernon, N. Y.
LTF	Littlefuse Inc.	Des Plaines, Ill.
OM	Ohmite Mfg., Co.	Chicago, Ill.
TRM	Thermador Electrical Mfg. Co.	Los Angeles, Calif.

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